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February 2009
CI/SFB (56)
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Specifiers Guide to

Electric heating solutions Part L

up to and including 2010

FLATS
APARTMENTS
TERRACED DWELLINGS

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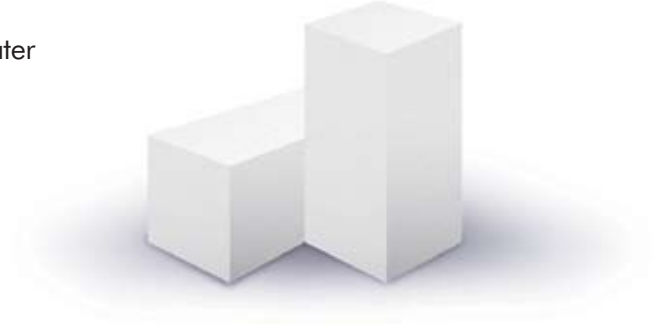
– DuoHeat® radiators

– EPX panel heaters

– RXPW4 controller

– SCx cylinder

– Solar hot water



Document scope

The Government last updated Part L of the Building Regulations for England and Wales in April 2006.

There are 4 approved documents to support the regulations:

Part L1A - Conservation of fuel and power for new dwellings
Part L1B - Conservation of fuel and power for existing dwellings
Part L2A - Conservation of fuel and power for new buildings other than dwellings
Part L2B - Conservation of fuel and power for existing buildings other than dwellings

This document is designed to provide guidance on using electric heating solutions for Part L1A 2006 up to and including 2010 for the following dwelling types: Apartments / Flats / Smaller Terraced Homes.

2010 to 2013

Further change to Part L are due to take place in 2010 and this will require a further reduction of 25% in energy use. Solution for achieving compliance for 2010 to 2013 is also modelled within this document. Further Specifier Guides on achieving Code for Sustainable Homes Level 3 and above are also available. For more details please see back cover.

About Dimplex

Dimplex is the brand leader in electric space and water heating, offering a selection of over 400 products within the sector – the widest in the world.

With a heritage of 60 years, Dimplex has an unmatched reputation for quality and reliability and unrivalled experience and resource, with its own design team and R&D facility to ensure the company remains at the forefront of product development and innovation.

A critical aspect of our success is built upon a policy of continuous investment in every area of the business – from product development right through to customer service. An ongoing programme of research, together with careful monitoring of customer needs and design trends helps direct this investment. No-one else in the industry invests more in developing products that constantly set new standards, with a central design facility on the outskirts of London and product category focused research teams at factories in the UK and Europe. Our investment in people, training and resources is reflected in the quality of our products and the standard of our before and post sales service. As part of our commitment to product quality, we also apply stringent controls to every part of our manufacturing process and are ISO9002 approved.

Part L1A 2006 – new domestic dwellings:

Overview

The 2006 regulations were designed to reduce energy use from new buildings by at least 20% over the 2002 regulations.

A key change from the 2002 regulations is that compliance is now based upon whole building carbon emissions, with the former compliance methodologies (elemental, target u-value and carbon index) now scrapped.

This important change means that building designers must now take a more holistic approach to the design of their buildings, considering the impacts of both the constructional elements as well as those of the energy using services (heating, hot water, lighting and ventilation). Air tightness also now has an additional impact, with minimum standards now applying which will have to be confirmed on building completion by sample pressure testing.

A new version of SAP (Standard Assessment Procedure) was produced to enable the necessary calculations to be carried out and includes a TER and DER calculator.

The TER (target carbon emissions) level is calculated using a 'notional' building of the same floor area / shape / etc. as the one being designed, with default element u-values and heating, hot water and ventilation systems applied so a carbon emissions figure can be calculated.

A carbon emissions improvement factor and allowance factor dependent on the heating fuel type are then applied to produce the TER target, expressed in $kgCO_2/m^2/yr$.

The DER (predicted dwelling carbon emissions) figure is calculated by applying the proposed building details (floor area / shape / element u-values / air tightness / heating / hot water / ventilation system / etc.) to SAP, which will produce a predicted carbon emissions figure for the buildings.

Improvements to the building fabric elements or building services types/efficiencies improve the DER, allowing compliance to be achieved. The DER must not exceed the TER.

Part L1A 2006 – new domestic dwellings:

Block assessment method

For buildings containing multiple dwellings such as flats, it is permissible to use a whole block methodology to demonstrate compliance. This is done by calculating the individual TER / DER for each dwelling and calculating the floor area weighted average TER and DER for the block.

This has the distinct benefit that better performing units within the block, for example mid floor flats with less exposed surface areas, can be used to trade off against ground floor and top floor flats, meaning it is not necessary to achieve compliance for every single dwelling, only the overall block.

This also provides the ability for innovative approaches to compliance to be taken, for example installing solar water heating for the top floor flats, providing an overall carbon saving benefit for the complete block. This and other compliance options are covered in more detail in the SAP.

Note: The Block Assessment Method does not apply post 2010.

Reducing building CO_2 (not just heating appliances)

Part L focuses on reducing carbon emissions and looks at how the building functions as a whole. As a result the insulation and building fabric may have to be improved, whatever the heating system specified. The diagram opposite shows eight key areas where simple adjustments can me made to the building design to reduce the TER.

Heat communal areas

For multiple occupancy dwellings like flats, specifying a low level of background heating in the communal areas, such as hallways, allows these walls to be disregarded from the SAP calculation as they no longer represent a heat loss.

Reduce hot water cylinder capacity

The cylinder efficiency is not affected by improvements in the thermal performance of the building fabric. However, the Building Regulations' TER calculation assumes a 170L cylinder capacity, so reducing this provides a carbon saving.

Include Solar Hot Water

Solar hot water provides up to 60% of a property's water heating needs. For multiple dwelling developments (such as flats) it's possible to use whole block methodology to demonstrate compliance with Part L. Solar hot water can be fitted to the top floor apartments to give a lower carbon dioxide emission, which is then traded off against the lower floors which may have higher emission rates. When inputting the data into SAP, using the Dimplex quoted net collector area and the (a_1) and (η_0) figures can have a marked improvement on the DER.

Include mechanical ventilation with heat recovery

The use of a high efficiency mechanical ventilation system with the ability to recover waste heat helps to reduce carbon emissions by recovering heat that would have been lost.

Basic fabric improvements

The notional building used to calculate the TER assumes u-values at the 2002 elemental level, i.e. walls at 0.35, glazing at 2.0, etc. Improving these by a modest amount to reduce the energy required to heat the building, e.g. walls to 0.3, glazing to 1.8, provides an immediate carbon dioxide emissions saving.

Reduce glazed area

The Building Regulations' TER calculation assumes glazing occupies up to 25% of the floor area. In practice, however, the glazed area for flats is generally much lower than this, reducing the level of improvement that specifiers need to achieve.

Improve controllability

The more controllable the heating appliance, the lower the carbon emissions. Dimplex electronic panel heaters or DuoHeat radiators score highly in SAP due to their controllability and energy efficiency.

Reduce air permeability

Improving air tightness beyond the mandatory level reduces emissions at relatively low cost. Electric heating has an advantage here as it reduces the quantity of pipes/holes in the building fabric. Reducing this too far may make MVHR mandatory.

Part L1A 2006 – Dimplex electric heating solution

The minimum functional and performance requirements for electric heating systems under Part L are listed in the governments Part L Domestic Heating Compliance Guide, but are categorised as follows:

- **Electric Panel Heaters**
- **Storage Heaters & Integrated Storage/Direct Systems**
- **Electric Hot Water**

Electric Panel Heaters

The Domestic Heating Compliance Guide states that:

> "Local time and temperature control integrated into product or connected separately to the product."

Dimplex offers a wide range of panel heaters including the PLX range which feature integrated time/temperature control, while the EPX range offers integrated time/temperature control or can be controlled separately via a wall mounted controller

Storage Heaters & Integrated Storage/Direct systems

The Domestic Heating Compliance Guide states that:

> "Charge control: Automatic control of input charge should be provided
> Temperature control: Controls for adjusting the rate of heat release from the appliance should be provided, such as an adjustable damper or some other thermostatically controlled means."

Dimplex XLS, CXLS and FXL storage heater ranges all meet these requirements, incorporating fully automatic charge controls and provide adjustable output controls. Dimplex DuoHeat radiators also provide highly sensitive electronic input charge and output controls, in addition to providing fully thermostatic output control over the radiant element.

Electric Hot Water

The Domestic Heating Compliance Guide states that:

> "Separate timing control of the hot water requirement."

The Dimplex SCx cylinders are able to meet this requirement.

Dimplex Renewables

Building designers are increasingly being encouraged to integrate renewables into their development plans by local planning authorities seeking to fulfill their PPS22.

Using renewable technology, such as Dimplex solar thermal panels or heat pumps also helps significantly to reduce the DER carbon emissions. It therefore makes sense to take advantage of these planning requirements by considering renewables as part of the buildings energy saving strategy.

For example this might be achieved by providing solar panels for domestic hot water heating, while continuing to specify low cost electric space heating, reducing CO_2 levels and meeting the renewables contribution targets at the same time.

This document will provide an example of a new dwelling using Dimplex Solar Thermal with electric heating to demonstrate compliance.

Advantages of using Electric Heating to Achieve Compliance

Designers taking a wider view of the buildings overall sustainability are also interested in considering lifetime system ownership costs. Electric heating systems do not require any regular maintenance or annual safety inspections. In addition, the efficiency of electrical resistance heating, which can be considered to be 100% at the point of use, does not deteriorate over the products lifetime, unlike centralized boiler systems, which lose efficiency sludge and particulates are circulated through the heat exchanger and distribution system.

A significant cause of air leakage are the number of building services such as pipes, ducts and holes which penetrate the building fabric and are insufficiently sealed to prevent unnecessary air leakage.

Electric heating systems require no pipework or flues to penetrate the building shell and therefore allowing a high level of air tightness to be achieved more easily

Part L Energy Strategy

In order to meet the 20% DER reduction target for 2006, improvements over the requirements of Part L1A 2002 need to be made, both in terms of building fabric and efficiency of the services.

The following outlines typical challenging but achievable criteria, which when used in combination as a holistic approach to energy saving can meet the requirements of Part L1A 2006.

Electric Heater scores within SAP

The table below identifies the ratings of electric heating appliances with SAP:

System	Efficiency	Type	R
Convector Storage (Dimplex CLX)	100%	4	0.25
Fan Storage (Dimplex FXL)	100%	3	0.50
Fan Storage + Celect Control	100%	3	0.75
Dimplex DuoHeat®	100%	2	0.75
Panel Heaters (Dimplex PLX/ EPX)	100%	1	1.00

Scenario: Complying with Part L 2006, utilising electric heating solution in multiple dwellings

Development type: 6 x 52m² apartments: 2 x Ground Floor Flats, 2 x Middle Floor Flats and 2 x Top Floor Flats

			Notes	
Fabric	Walls	0.30a		
U-values W/m²K	Roof	0.11		
	Ground Floor	0.25		
	Doors	1.80		
	Windows	1.80		
	Thermal bridging	0.08	Accredited construction details	
Ventilation	Air tightness ($m^3/m^2/hr$@50Pa)	7.0		
	Standard Fans		1 x Kitchen 1 x Bathroom	
Heat Loss Parameter Achieved		Not Applicable 2006		
Heating System	Integrated Storage/Direct		100% efficiency selected in SAP	
	Controls	Room Thermostats + Central Programmes		
	Water Heating	Direct electric via immersion + solar to top floor flats	Dimplex SCx unvented cylinders, manufacturers stated standing losses applied	
			Ground + Middle Floor Flats: SCX150d	
			Top Floor Flats: SCX175sd + 2 m² Solar East/West Orientation	
	10% Secondary Heating	Electric		
Low energy lighting	Internal	Only 25% benefit is SAP		
CO_2 Emissions	Flat Type	Ground Floor	Middle Floor	Top Floor
	Block Assessment TER		37.1	
	Block Assessment DER		36.9	

Dimplex Heating System		
DuoHeat Radiators & EPX Panels Heaters	Living Room – Duo500n Hall – Duo300n Bathroom – EPX500 Bedroom 1 – EPX750 Bedroom 2 – EPX500	
Controls	**RXPW4**	
Domestic Hot Water	**Ground/Middle Floor Flats**	**Top Floor Flats**
Individual water storage cylinders in each apartment, heated by off peak electric immersion with boost immersion	SCx150d,1 per apartment	SCX175sd Solar 2m²

Scenario: Complying with Part L 2006, utilising electric heating solution in terraced homes

Development type: 70m² Terraced House

			Notes
Fabric	Walls	0.35	
U-values W/m²K	Roof	0.16	
	Ground Floor	0.20	
	Doors	1.80	
	Windows	1.80	
	Thermal bridging	0.08	Accredited construction details
Ventilation	Air tightness ($m^3/m^2/hr$@50Pa)	10.0	
	Standard Fans		1 x Kitchen 1 x Bathroom 1 x WC
Heat Loss Parameter Achieved		Not Applicable 2006	
Heating System	Integrated Storage/Direct		100% efficiency selected in SAP
	Controls	Room Thermostats + Central Programmer	
	Water Heating	Direct electric via immersion + solar	Dimplex SCx 175sd unvented cylinders, 60mm insulation
	10% Secondary Heating	Electric	
Low energy lighting	Internal	50%	
CO_2 Emissions	TER	29.72	
	DER	28.97	

Dimplex Heating System	
DuoHeat Radiators & EPX Panels Heaters	Living Room – Duo500n Hall – Duo400n WC – EPX500 Bathroom – EPX500 Bedroom 1 – EPX750 Bedroom 2 – EPX500
Controls	**RXPW4**
Domestic Hot Water	
Individual water storage cylinders heated by off peak electric immersion with boost immersion	SCx175sd Solar 2m² South East / South West Orientation

Scenario: Complying with Part L 2010, utilising electric heating solution in multiple dwellings

Development type: 6 x 52m² apartments: 2 x Ground Floor Flats, 2 x Middle Floor Flats and 2 x Top Floor Flats

			Notes
Fabric	Walls	0.21	
U-values W/m²K	Roof	0.11	
	Ground Floor	0.11	
	Doors	1.5	
	Windows	1.5	
	Thermal bridging	0.08	Accredited construction details
Ventilation	Air tightness (m³/m²/hr@50Pa)	6.0	
	Standard Fans		1 x Kitchen 1 x Bathroom
Heat Loss Parameter Achieved		Ground Floor & Top Floor 1.23	Middle Floor 1.07
Heating System	Integrated Storage/Direct		100% efficiency selected in SAP
	Controls	Room Thermostats + Central Programmer	
	Water Heating	Direct electric via immersion + Solar	Dimplex SCx 175sd unvented cylinders, manufacturers stated standing losses applied
	10% Secondary Heating	Electric	
Low energy lighting	Internal	75%	
	External	100%	All communal and security lighting
CO_2 Emissions	TER	G/F 38.90	M/F 33.89 T/F 38.05
	DER	G/F 28.04	M/F 23.91 T/F 27.99
	Improvements %	G/F=25.35%	M/F=29.45% T/F=26.44%
		G/F = Ground Floor;	M/F = Middle Floor; T/F = Top Floor

Dimplex Heating System			
DuoHeat & Panels	Living Room – Duo400n Hall – Duo300n Bathroom – EPX500 Bedroom 1 – EPX750 Bedroom 2 – EPX500		
Controls	**RXPW4**		
Domestic Hot Water	**Ground Floor**	**Middle Floor**	**Top Floor**
Individual water storage cylinders in each apartment, heated by off peak electric immersion with boost immersion	SCx175sd Solar 2m² East/west orientation	SCX175sd Solar 4m²	SCX175sd Solar 4m²

Scenario: Complying with Part L 2010, utilising electric heating solution in terraced homes

Development type: 70m² Terraced House

			Notes
Fabric	Walls	0.21	
U-values W/m²K	Roof	0.11	
	Ground Floor	0.11	
	Doors	1.5	
	Windows	1.5	
	Thermal bridging	0.08	Accredited construction details
Ventilation	Air tightness (m³/m²/hr@50Pa)	5.0	
	Standard Fans		1 – Kitchen 2 – Bathroom 3 – WC
Heat Loss Parameter Achieved		1.01	
Heating System	Integrated Storage/Direct		100% efficiency selected in SAP
	Controls	Room Thermostats + Central Programmer	
	Water Heating	Direct electric via immersion + Solar	Dimplex SCx 175sd unvented cylinders, manufacturers stated standing losses applied
	10% Secondary Heating	Electric	
Low energy lighting	Internal	75%	
	External	100%	
CO^2 Emissions	TER	29.72	
	DER	22.17	
	Improvement	25.40	(Ene1) 5

Primary Heat Source	
DuoHeat & Panels	Living Room – Duo500n Hall – Duo400n WC – EPX500 Bathroom – EPX500 Bedroom 1 – EPX750 Bedroom 2 – EPX500
Controls	**RXPW4**
Domestic Hot Water	
Individual water storage cylinders heated by off peak electric immersion with boost immersion	SCx175sd Solar 4m² South East / South West Orientation

DuoHeat® radiators

- Patented 'smart' heat manager automatically controls output level from each heat source, optimising controllability and economy*.
- Single, simple to use and understand electronic user control, with child lock facility:
  - Electronic room temperature control allowing user adjustment of heater output.
  - User configurable electronic automatic input charge regulator.
- Savings of up to 10% compared with traditional off-peak electric heating systems, recognised by SAP2005.
- Compatible with Dimplex 4-zone, multi-heater programmers.
- Stylish, slim-line with concealed grille.
- Heat output provided by a combination of off-peak and standard rate electricity sources.
- Pre-wired electrical connections.
- Simple, secure wall fixings and snap fit feet.
- Easy-fit front panel connections.
- Compatible with all off-peak tariffs.

Please note: Information provided relates to 'n' range models only, not previous 'i' range. * Patent number GB2384300

Model Duo400n

EPX electronic panel convector heaters

- Electronic thermostatic control, providing room temperature stability to +/-0.3°C.
- Range of optional plug-in electronic timer modules, including: – 24 hour digital timer
  – Single-zone pilot wire programmer
  – Runback timer
- Compatible with Dimplex 4-zone, wall mounted pilot wire and mains borne signalling multi-heater programmers.
- Stylish design with forward facing louver grille for optimum heat circulation.
- Aesthetics to complement DuoHeat radiators, with pure white finish.
- Pre-set background temperature at 5°C below thermostat setting.*
- Splash-proof (IPX4) rated, for use in bathrooms or wet areas.
- Completely silent operation.
- Simple detachable wall bracket for easy installation.

*When connected to a programming unit supporting setback feature.

Model EPX1500

RXPW4

• Wall mounted, mains powered units • Installer configurable option to allow switching between Comfort/Setback modes, Comfort/Off modes or Comfort/Frost protection modes • Manual programme over-ride facility, with automatic return to programme at next timed change • Continuous Comfort, Setback, Frost protection and Off modes* • Holiday (time absence) mode • Easy to install and configure • RXPW4 pilot wire programmer can be used with RXPWIF interface unit to control ancillary appliances, such as towel rails or hot water systems.

Model RXPW4

Note: For MBS option, RX9913 receiver cassettes are required for each panel heater or RX03002 for each DuoHeat radiator. *Off mode not applicable for DuoHeat.

SCx unvented cylinders

- 60mm CFC free insulation reduces heat loss.
- Mains pressure hot water.
- Fast filling baths.
- Powerful invigorating showers.
- Simultaneous supply of water to all bathrooms.
- No cold water storage tank required, freeing up valuable living space.
- Long life low maintenance hot water supply.
- Backed by a big name in domestic heating.
- Option of a brushed stainless steel outer case.
- Duplex steel inner cylinder with 25 years guarantee.
- Internal expansion for quick easy installation.
- Tough plastic leather grain external coating resists scratching.
- No anode – reduces service requirements.
- CFC free foam injected insulation.
- 3kW incoloy 825 immersion(s) for longer life.
- Light-weight for easy handling to site.
- Water inlet diffuser prevents cold and hot water mixing.

SCx with optional immersion cover

Solar package

- Combines all the necessary components into correctly matched packages for a range of standard installations.
- Designed to make specification and purchase easy.
- Every component carefully selected for its quality and suitability for the UK climate.

Roof kit packages

- Choice of 2m², 4m² and 6m² collector kits.
- On roof mounting for plain tile, corrugated tile or slate roofs.
- Integrated roof mounting for tile or slate roofs.
- Free standing panels for flat roof's or ground level mounting.

Hydraulic packages

- Pump station.
- Control unit.
- Heat transfer fluid.
- Expansion vessel and fixing kit.

Range of cylinders

Available with single coil and dual immersions for direct electric systems or dual coils for use with a secondary heat source (such as a boiler). 25 years cylinder warranty.
Sizes available:

- 175 Litre
- 215 Litre
- 255 Litre
- 305 Litre

ROUTEONE

Compliance strategies

Your guide to our specifiers guides:

Guide 1 Electric Heating Solutions Part L up to and including 2010 – Flats and Terraced Housing

Guide 2 Achieving Code Level 3 using Electric Heating – Flats and Terraced Housing

Guide 3 Achieving Code Level 3 using Heat Pumps – Flats

Guide 4 Achieving Code Level 3 using Heat Pumps – Housing

Guide 5 Achieving Code Level 4 using Heat Pumps – Flats

Guide 6 Achieving Code Level 4 using Heat Pumps – Housing

The Dimplex Range

Dimplex offers the widest range of electric space, water heating and renewable solutions in the UK. In addition to this publication, we have a number of more focused brochures. Choose from:

Range brochure

Heat pumps brochure

Solar heating brochure

Water heating brochure

Commercial brochure

Outdoor heating brochure

Portables brochure

Fires brochure

For a copy of one of the above guides or to discuss a project in more detail, please:

visit: www.dimplex.co.uk/routeone

phone: 01489 773336

email: marketing@dimplex.co.uk

Alternatively our heating design team are also available at the end of a phone to help you achieve compliance or we can arrange for one of our key account managers to visit you.

Dimplex®

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D1382/0209